

INTERSTATE ACCESS REQUEST

***INTERSTATE 75 AT
INTERSTATE 24***

HAMILTON COUNTY



*Prepared by
PALMER
ENGINEERING*

FOR THE
TENNESSEE DEPARTMENT OF
TRANSPORTATION
PLANNING DIVISION

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Executive Summary

The existing I-75 and I-24 corridor is a heavily traveled corridor that serves Tennessee and Georgia. Both I-75 and I-24 provide a direct connection to downtown Chattanooga, Lookout Mountain, and other area attractions, while I-24 also serves as a direct link between I-75 and I-59. A road safety audit evaluated the I-75 at I-24 interchange area in 2006 and found a high area for crashes. Further review found that truck rollovers were common on the I-75 Northbound and Southbound ramps, with speed being a contributing factor. Rear-end and sideswipe crashes were found to be high on I-75 NB which are due to short merging distances between the Ringgold Road interchange and the I-24 interchange. The on and off ramps at the Welcome Center located between the Ringgold Road and I-24 interchanges also contribute to these crashes. As traffic volumes have increased along the I-24 and I-75 corridors, and with continued growth in the area, the existing interchange at I-75 and I-24 will become more congested and will exceed capacity resulting in increased concern for the interchange safety. This Interstate Access Request (IAR) identifies the modifications required to address the deficiencies of the existing interchange.

Seven (7) alternates were developed for the proposed interstate modifications at a preliminary field review:

- Alternative 1: Widens existing roads and ramps along existing alignments; maintains existing 50 mph design speed
- Alternative 2: Widens existing roads and ramps; increases ramp radii to provide design speed of 70 mph
- Alternative 3: Widens existing roads and ramps; increases ramp radii to provide design speed of 70 mph; shifts interchange to west
- Alternative 4: Widens existing roads and ramps; increases ramp radii to provide 55 mph design speed; shifts interchange to west
- Alternative 5: Widens existing roads and ramps; increases ramp radii to provide design speed of 70 mph; reconfigures I-24 ramps to enter and exit I-75 from the right side
- Alternative 6: Widens existing roads and ramps; increases ramp radii to provide design speed of 70 mph; reconfigures I-24 ramps to enter and exit I-75 from the right side; shifts interchange to west; modifies rest area traffic circulation
- Alternative 7: Widens existing roads and ramps; increases ramp radii to provide 55 mph design speed; reconfigures I-24 ramps to enter and exit I-75 from the right side; shifts interchange to west; modifies rest area traffic circulation

The Federal Highway Administration (FHWA) was involved in a meeting to review these preliminary alternatives for this Interstate Access Request. Alternates 4 and 7 were ultimately selected for carrying forward to the IAR phase and are documented further within this study. Alternate 7 is the preferred alternate. Operational approval is requested for both Alternates 4 and 7 in the event that funding cannot be secured for the more expensive Alternate 7.

Alternative 4 widens the interstate by adding additional lanes with the on ramps at Ringgold Road, South Moore Road, and East Brainerd Road and then dropping those lanes to tie into the existing system with the off ramps at these adjacent interchanges. The existing ramps are widened to three (3) lanes and radii are increased to a minimum 1200 feet to improve the design speed to 55 mph. The interchange is shifted slightly towards the vacant land west of the interchange in order to prevent encroaching on a conservation area but the existing configuration is maintained. Alternative 4 maintains the existing rest area configuration and does not eliminate the existing weaving condition along NB I-75 between the Ringgold Road Interchange and the rest area ramps.

Alternative 7 is similar to Alternative 4 with the following modifications: The I-24 ramps are reconfigured to provide all entry and exit along the right side of I-75, developing I-75 as the thru route. Alternative 7 modifies the circulation patterns of the existing rest area to eliminate the weaving condition along NB I-75 and modifies the WB Ringgold Road to NB I-75 ramp. To provide the opportunity to improve the traffic flow along each of the facilities as funding becomes available, the modifications of Alternative 7 has been developed into a two (2) phase plan. Alternate 7 is the preferred alternate based on the ability to eliminate the weave conditions along I-75.

A Level of Service (LOS) analysis was conducted as part of this IAR to determine the relative performance of each alternative in 2015 and 2035, during the AM and PM Peak periods. The traffic operation analyses were completed using HCS (Highway Capacity Software) on basic freeway segments, weaving segments, ramp merge segments, and ramp diverge segments. Level of Service was used as the measure of effectiveness. Results of the HCS analysis revealed that the existing I-75 and I-24 interchange and the respective corridors will operate at or exceed capacity in the design year, resulting in long delays and congestion if the proposed modifications are not completed. The LOS analyses in Tables 1 thru 5 document the existing capacity of each freeway and ramps through the design year. These tables also document the performance of each segment if the improvements outlined in Alternates 4 and 7 of this Interstate Access Request are completed. Modifications to the I-24/I-75 interchange will decrease congestion and improve substandard ramp geometry resulting in an increase in safety and interstate capacity. Deceleration and acceleration lanes that meet or exceed AASHTO's "A Policy on Geometric Design of Highways and Streets" are provided to enhance merge/diverge points throughout the interchange study area. Enhanced ramp geometry allows improved ramp design speeds and decreases the potential for truck rollovers. The combination of these modifications should reduce congestion and improve safety along the I-24 and I-75 corridor.

The total estimated construction costs for Alternatives 4 and 7 are detailed in Appendix G. The estimated cost associated with Alternative 4 is \$50,200,000. Alternative 7 is expected to cost \$34,100,000 in the Initial Phase and an additional \$54,900,000 (2025 dollars) in the Ultimate Phase.

CHAPTER 1

INTRODUCTION

A. Purpose of the Study

The purpose of this study is to determine the need and justification of modifying the existing I-24 and I-75 interchange in southeast Chattanooga. The proposed modifications will address operational deficiencies that have resulted from growth in the Chattanooga area and safety issues that have developed due to substandard ramp geometry. This study identifies the need for the current and future improvements, analyzes traffic conditions, develops functional layouts for the project, estimates construction costs, and identifies potential environmental, historical, and cultural concerns.

B. Description of Project Location

I-24 within the study area is primarily a six (6) lane, controlled-access facility that is separated by a concrete barrier wall and has a right of way width along I-24 of approximately 500 ft.

The proposed project is located southeast of Chattanooga in Hamilton County, TN and is bounded by adjacent interchanges that vary in proximity and configuration.



Figure 1: I-24 at South Moore Road

I-75 within the study area is primarily an eight (8) lane, controlled-access facility that is separated by a concrete barrier wall and the right of way along I-75 varies from approximately 300 to 600 ft in width.



Figure 2: I-24 at the I-75 interchange

Approximately 1.1 miles to the west is the I-24/South Moore Road interchange and approximately 2.2 miles to the east is the I-75/East Brainerd Road interchange. The I-75/Ringgold Road interchange is approximately 1.1 miles to the south and the Tennessee Welcome Center is located along I-75 NB between the Ringgold Road and I-24 interchanges. Both I-24 and I-75 are public facilities as are all the adjacent interchange crossroads and the project is located within a Transportation Management Area (TMA).

C. Purpose and Need

The purpose of the modifications to the I-24/I-75 interchange is to decrease congestion, improve substandard ramp geometry, improve safety, increase interstate capacity, and improve traffic operations. The modifications are needed to provide a safer facility for roadway users due to high crash rates and truck rollovers throughout the I-24/I-75 interchange.



Figure 3: I-75 SB prior to I-24 WB Diverge



Figure 4: I-75 NB prior to I-24 WB Diverge

D. Background

As traffic volumes have increased along the I-24 and I-75 corridors, and with continued growth in the area, the existing interchange at I-75 and I-24 will not provide capacity for the projected traffic volumes resulting in increased concern for the interchange safety. I-75 was evaluated by the Road Safety Audit Review program in 2006 along the project corridor (LM 1.11 to LM 1.20). It was determined that the area crash ratio (actual crash rate divided by critical crash rate) was 5.75, which exceeded the 3.5 minimum threshold rate. The review found that truck rollovers were common on I-75 Northbound and Southbound, with speed being a contributing factor. Rear-end and sideswipe crashes were also found to be high on I-75 NB which are due to short merging distances between the Ringgold Road interchange and the I-24 interchange. The on and off ramps at the Welcome Center also contribute to these crashes due vehicles entering and exiting the welcome center in a short distance. This roadway segment along I-75 NB between the Welcome Center and the I-24 interchange functions as a weaving segment with vehicles traveling I-75 NB, I-24 WB, exiting to the Welcome Center, and entering from the Welcome Center.

E. Relationship To Previous Planning Studies

The Chattanooga-Hamilton County/ North Georgia (CHCNGA) Transportation Planning Organization's (TPO) Long-Range Transportation Plan for 2035 identifies several projects within the project vicinity in their "*All Year 2035 Needs Plan*" to alleviate congestion. The following list identifies area projects while Figure 5 is a map from the Long Range Transportation Plan that visually locates these projects:

1. *I-24 between Belvoir Ave and I-75*: Interchange reconstruction.
2. *I-75, south of I-24 interchange*: Interstate widening.
3. *I-75, east of I-24 interchange*: Interstate widening.

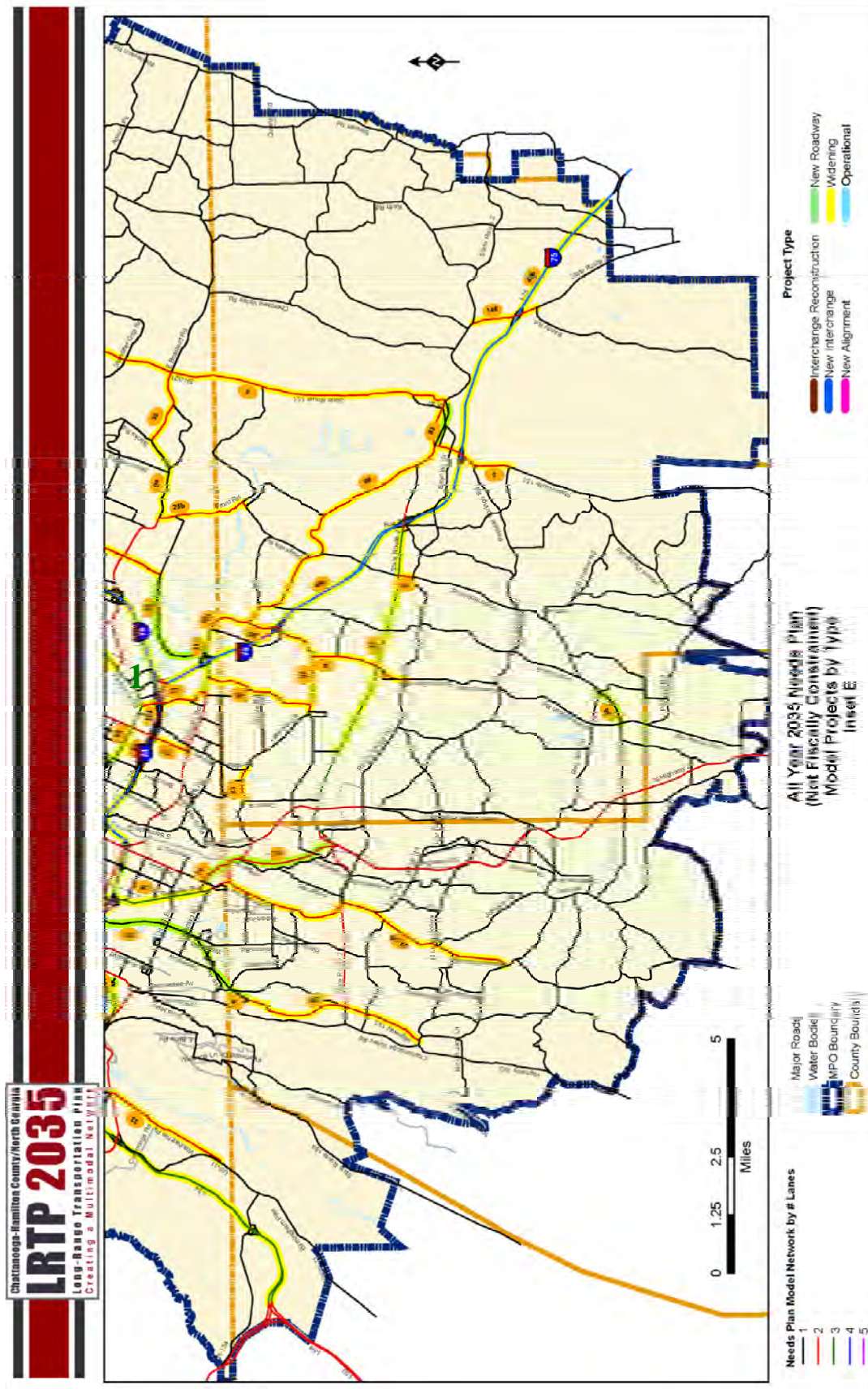


Figure 5: LRTP Project Map



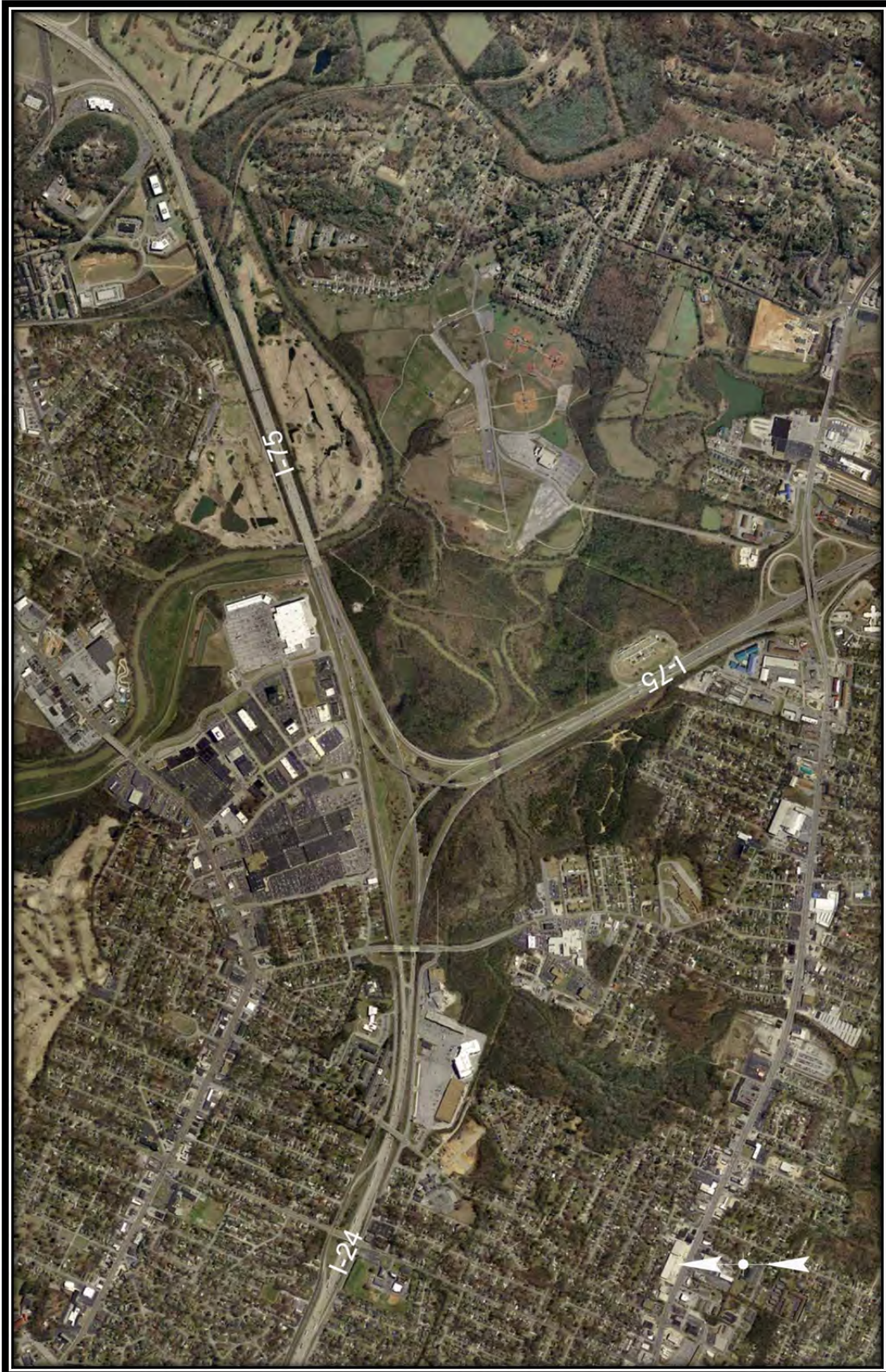


Figure 7: Project Location Map

CHAPTER 2

PRELIMINARY PLANNING DATA

A. Land Use

The area to the north of the interchange consists mostly of residential and commercial land uses. The area to the southwest of the I-24/I-75 interchange is primarily zoned for residential, commercial, and office use although some of the area zoned for commercial use has yet to be developed. The area in the southwest and southeast quadrants is in a floodplain and has been identified as an environmentally sensitive area due to the wetlands. The area to the southeast of the I-24/I-75 interchange is primarily zoned residential, agriculture, and commercial. This area contains Camp Jordan Park, which is protected from development by a conservation easement adjacent to the interchange right of way. A land use map is displayed in Figure 8.

B. Proposed Improvement

Seven (7) alternatives were presented for the proposed interstate modifications at a preliminary field review. The following table briefly describes the differences in the alternatives.

Alternative	Description	Reasons Eliminated
Alternative 1	Widens along existing interstate	Ramp design speed is less than 55 mph
Alternative 2	Improves ramp design speed to 70 mph	Impacts to conservation area east of I-75
Alternative 3	Improves ramp design speed to 70 mph & shifts interchange to west to avoid conservation area	Property impacts & geometric design concerns
Alternative 5	Improves ramp design speed to 55 mph	Impacts to conservation area east of I-75
Alternative 6	Improves ramp design speed to 55 mph & shifts interchange to west to avoid conservation area	Property impacts & geometric design concerns

Appendix A provides a more detailed description and plan view of Alternatives 1-3 and 5-6. Alternatives 4 and 7 are presented in more detail within this document. Operational approval is requested for both Alternatives 4 and 7 but Alternative 7 is the preferred alternative. Operational approval is requested for Alternative 4 in the event that funding cannot be secured for the more expensive Alternative 7. Control of access will be maintained for a minimum of 100' in each direction at each interchange ramp terminal for both alternatives. In addition to the modifications outlined in this study, the crossroads along adjacent interchanges should be analyzed during final design to determine if right-in right-out intersections or improved striping could be effective.



Alternative 4

Alternative 4 widens the interstate by adding additional lanes with the on ramps at Ringgold Road, South Moore Road, and East Brainerd Road and dropping those lanes to tie into the existing system with the off ramps at these adjacent interchanges. The existing ramps are widened to three (3) lanes and radii are increased to a minimum 1200 feet to allow for a design speed of 55 mph. The interchange is shifted slightly towards the vacant land west of the interchange in order to prevent encroaching on the conservation area but the existing configuration is maintained. Alternative 4 maintains the existing rest area configuration and does not eliminate the existing weaving condition along NB I-75 between the Ringgold Road Interchange and the Welcome Center ramps. Figure 9 details an overview of Alternative 4 and detailed drawings may be found in Appendix B.

Alternative 4 construction includes the following:

- Widen I-24 EB to four (4) lanes between Belvoir Ave on-ramp and South Moore Road on-ramp
- Widen I-24 EB to five (5) lanes between South Moore Road on-ramp and I-24/I-75 diverge
- Construct the new bridge along Spring Creek Road that crosses over I-24 EB and WB
- Widen I-24 WB to six (6) lanes between I-75 merge and east of the Spring Creek Road bridge
- Widen I-24 WB to five (5) lanes between east of the Spring Creek Road bridge and South Moore Road off-ramp
- Widen I-24 WB to four (4) lanes between South Moore Road off-ramp and South Moore Road on-ramp
- Widen I-24 WB to five (5) lanes between South Moore Road on-ramp and Belvoir Ave off-ramp
- Reconstruct the Belvoir Ave on-ramp to I-24 EB
- Construct the new bridge along McBrien Road over I-24
- Construct the new bridge along South Moore Road over I-24
- Widen I-24 EB to I-75 NB ramp to three (3) lanes
- Widen I-75 SB to I-24 WB ramp to three (3) lanes
- Construct the I-75 to I-75 (NB and SB) ramps
- Widen/Construct I-24 EB to I-75 SB ramp to three (3) lanes
- Construct the new bridge along the I-24 EB to I-75 SB ramp that crosses Spring Creek
- Widen/Construct I-75 NB to I-24 WB ramp to three (3) lanes
- Construct the new bridge along the I-75 NB to I-24 WB ramp that crosses over the I-24 EB to I-75 NB ramp
- Construct the new bridge along the I-75 SB to I-75 SB ramp that crosses over the I-24 EB to I-75 NB ramp

- Construct the new bridge along the I-75 SB to I-75 SB that crosses over the I-75 NB to I-24 WB ramp
- Construct the new bridges along the I-75 to I-75 ramps (NB and SB) that crosses Spring Creek
- Widen I-75 SB to six (6) lanes between I-24/I-75 merge and rest area off-ramp (I-75 NB)
- Widen I-75 SB to five (5) lanes between rest area off-ramp (I-75 NB) and Ringgold Road off-ramp
- Widen I-75 SB to four (4) lanes between Ringgold Road off-ramp and existing overpass at Ringgold Road
- Widen I-75 NB to four (4) lanes between Ringgold Road on-ramp and Rest Area on-ramp
- Widen I-75 NB to five (5) lanes between Rest Area on-ramp and I-75/I-24 diverge
- Widen I-75 NB to five (5) lanes between I-75/I-24 merge and East Brainerd Road off-ramp
- Widen I-75 SB to five (5) lanes between East Brainerd Road and I-24/I-75 diverge
- Widen I-75 NB and SB bridge over Chickamauga Creek
- Widen I-75 NB and SB bridge over railroad
- Construct retaining wall along I-24 WB
- Construct retaining wall along I-75 NB to I-75 NB ramp

The project team discussed increasing the exit ramp radii at the welcome center but with an established floodway along the rear of the existing rest area and minimal increase in design speed this improvement was discarded. The team also discussed lengthening the weaving segment in front of the welcome center but found this adversely impacted the Ringgold Road interchange.

An operational analysis for Alternative 4 is presented in Chapter 3.

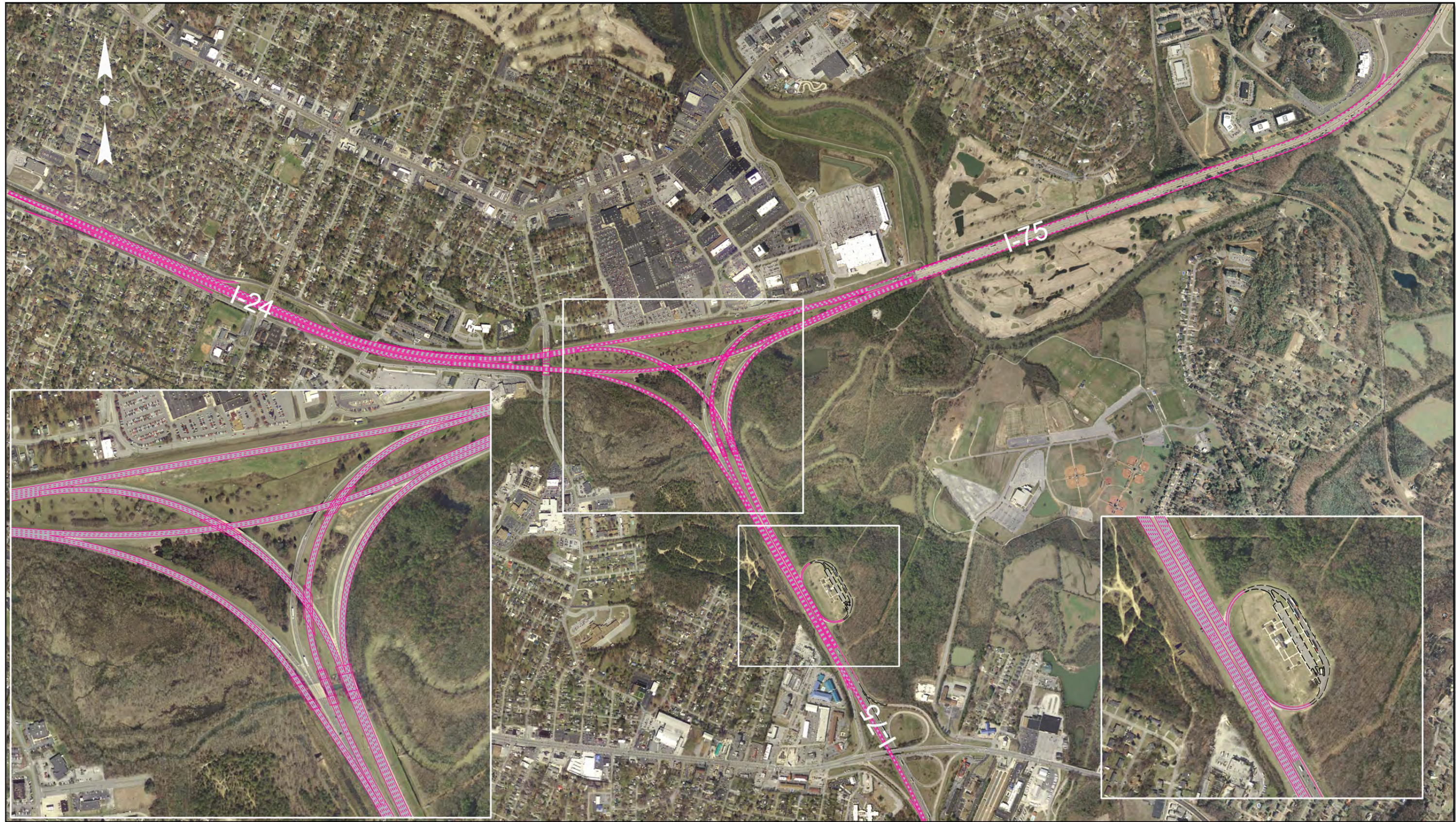


Figure 9: Alternative 4

Alternative 7

Alternative 7 adds additional lanes with the on ramps at Ringgold Road, South Moore Road, and East Brainerd Road and drops these lanes to tie into the existing system with the off ramps at these adjacent interchanges to allow for widening the existing interstate facility. I-75/I-24 ramps are widened to three (3) lanes with increased minimum radii of 1200 feet which provides for a 55 mph design speed. The I-24 ramps are reconfigured to provide all entry and exit along the right side of I-75, developing it as the thru route. Alternative 7 modifies the circulation patterns of the existing rest area to eliminate the weaving condition along NB I-75. The rest area realignment also would modify the WB Ringgold Road to NB I-75 ramp. The modification would realign the ramp to go behind the existing rest area and merge with I-75 north of the existing rest area. Traffic along the proposed ramp traveling NB I-75 will use a ramp parallel to the existing NB ramp and vehicles traveling to I-24 WB will diverge onto the I-24 flyover ramp.

To provide the opportunity to improve traffic flow along each of the facilities as funding becomes available, the modifications of Alternative 7 has been developed into a two (2) phase plan. The Initial Phase consists of constructing the I-75 thru ramps and minor interstate widening to tie in to the proposed ramps. The Ultimate Phase consists of widening the I-75/I-24 ramps, constructing the new rest area configuration, and major interstate widening. Figure 10 provides a layout of Alternative 7 and detailed drawings of the Initial and Ultimate Phases of Alternative 7 may be found in Appendix C.

It is anticipated that the Initial Phase of Alternative 7 will take 2 years to construct. The Initial Phase construction includes the following:

- Construct two (2) lanes of the proposed I-24 EB to I-75 SB ramp
- Construct the new bridge (full width) along the I-24 EB to I-75 SB ramp
- Construct two (2) lanes of the proposed I-75 NB to I-24 WB ramp
- Construct the new bridge (full width) along the I-75 NB to I-24 WB ramp that crosses Spring Creek
- Construct the new bridge (full width) along the I-75 NB to I-24WB ramp that crosses the I-24 EB to I-75 NB ramp
- Construct the new bridge (full width) along Spring Creek Road that cross over I-24 WB
- Construct the I-75 to I-75 ramps (NB and SB)
- Construct the new bridges along the I-75 to I-75 ramps (NB and SB) that crosses over the I-24 EB to I-75 NB ramp
- Construct the new bridges along the I-75 to I-75 ramps (NB and SB) that crosses over the I-75 NB to I-24 WB ramp
- Construct new bridges along the I-75 ramps (NB and SB) that crosses Spring Ck
- Reconstruct existing I-75 NB freeway between the I-24 EB and I-75 NB merge to the existing bridge over Chickamauga Creek
- Widen existing bridge along I-75 NB that crosses over Chickamauga Creek

- Widen I-75 SB to five (5) lanes between the I-75 SB and I-24 EB ramp merge and the Ringgold Road Interchange off-ramp
- Widen I-75 SB to four (4) lanes between the Ringgold Road Interchange off-ramp and existing overpass at Ringgold Road
- Construct two (2) lane exit at I-75 SB to Ringgold Road off-ramp
- Remove existing I-75 SB ramp
- Remove portions of existing I-75 NB and ramps not used in the Ultimate Phase

The Ultimate Phase construction of Alternative 7 consists of the following:

- Widen I-24 EB to I-75 SB ramp to three (3) lanes
- Widen I-75 NB to I-24 WB ramp to three (3) lanes
- Widen I-24 EB to I-75 NB ramp to three (3) lanes
- Widen I-75 SB to I-24 WB ramp to three (3) lanes
- Construct new Rest Area on-ramp and Ringgold Road to I-75 ramp
- Construct new parallel ramp for rest area and Ringgold Road traffic to I-75 NB
- Widen I-75 NB to four (4) lanes between Ringgold Road off-ramp (loop) and where existing Ringgold Road on-ramp is located
- Widen I-75 NB to five (5) lanes between existing Ringgold Road on-ramp to I-75/I-24 diverge
- Reconstruct Welcome Center off-ramp
- Widen location at I-24 EB to I-75 NB Ramp merge with new parallel ramp to I-75 NB to three (3) lanes
- Widen I-75 NB to six (6) lanes between I-24 merge and east of the Chickamauga Creek bridge
- Widen I-75 NB to five (5) lanes between east of the Chickamauga Creek bridge and the East Brainerd Road off-ramp
- Widen the existing bridges along I-75 NB and I-75 SB that cross over the railroad
- Widen I-75 SB to five (5) lanes between East Brainerd Road and the I-75/I-24 diverge
- Widen existing bridge along I-75 SB that crosses over Chickamauga Creek
- Widen I-24 WB to six (6) lanes between I-75 merge and east of the Spring Creek Road bridge
- Widen I-24 WB to five (5) lanes between east of the Spring Creek Road bridge and South Moore Road off-ramp
- Widen I-24 WB to four (4) lanes between South Moore Road off-ramp and South Moore Road on-ramp
- Widen I-24 WB to five (5) lanes between South Moore Road on-ramp and Belvoir Ave off-ramp
- Widen I-24 EB to four (4) lanes between Belvoir Ave on-ramp and South Moore Road on-ramp
- Widen I-24 EB to five (5) lanes between South Moore Road on-ramp and I-24/I-75 diverge
- Reconstruct the Belvoir Ave on-ramp to I-24 EB
- Construct the new bridge along Spring Creek over I-24 EB
- Construct the new bridge along McBrien Road over I-24

- Construct the new bridge along South Moore Road over I-24
- Widen I-75 SB to six (6) lanes between I-24/I-75 merge and rest area off-ramp (I-75 NB)
- Widen I-75 SB to five (5) lanes between rest area off-ramp (I-75 NB) and Ringgold Road off-ramp
- Construct retaining wall along parallel ramp connecting Rest Area/Ringgold Road to I-75 NB. Also construct retaining wall along I-24 WB.

Alternative 7 is the preferred alternative. An operational analysis of both the Initial and Ultimate Phases of Alternative 7 is presented in Chapter 3.

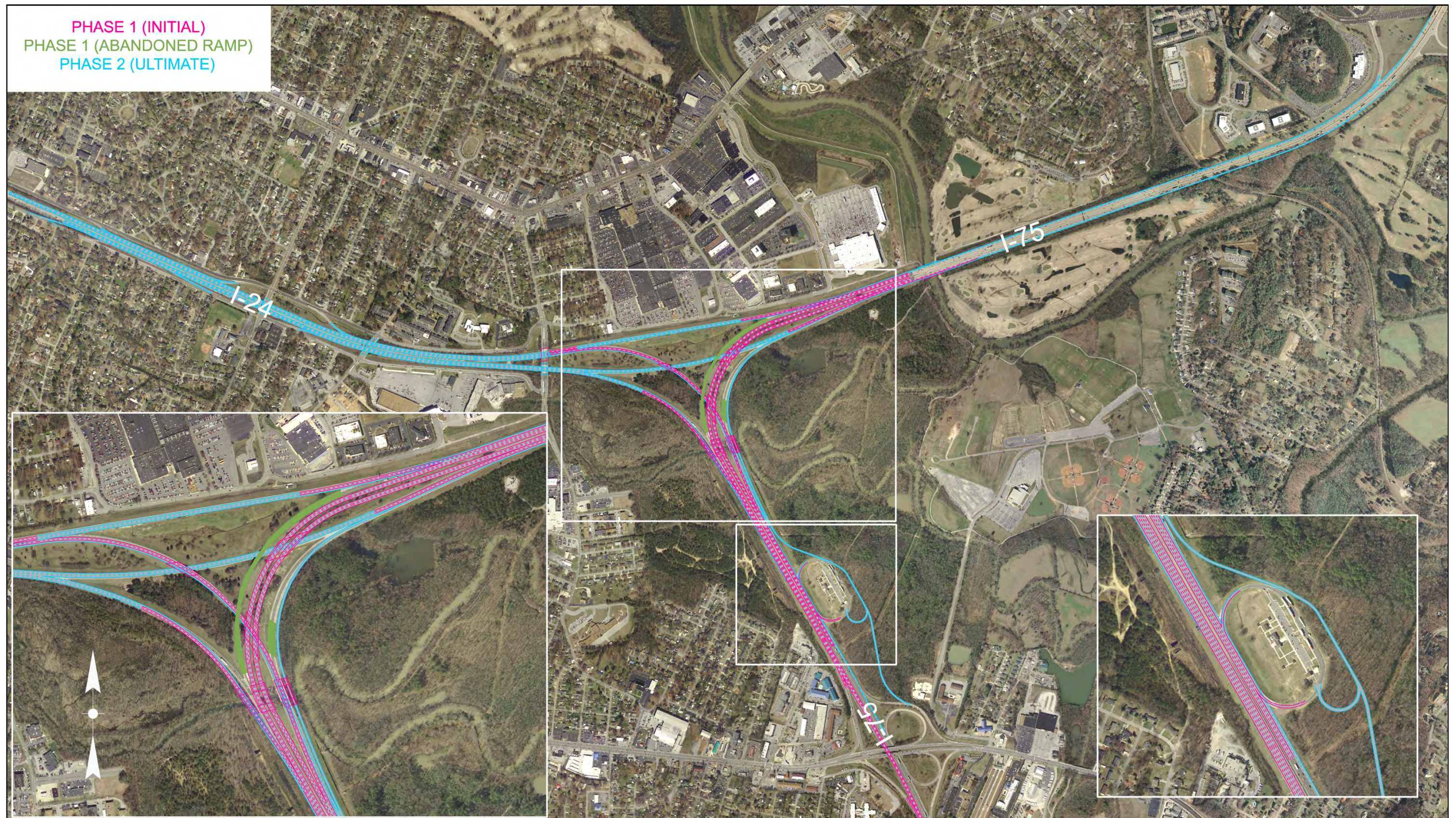


Figure 10: Alternative 7

CHAPTER 3

ENGINEERING INVESTIGATIONS

A. Traffic Operations

Traffic Data

The Chattanooga TransCAD Travel Model was provided by the Chattanooga Transportation Planning Organization (TPO) for use in forecasting volumes and distributions in this study. The 2035 Travel Model is the current TPO model, which includes the current land use and has the long range transportation plan incorporated. The base model data was compared to existing traffic count data for the I-24 and I-75 corridor and were determined to be calibrated along the interstate.

Traffic forecasts were developed along I-24 and I-75 for the base year 2015 and a design year 2035. Existing 2009 count stations were used to develop Annual Average Daily Traffic (AADT) along the interstate and ramps. These volumes were forecasted to 2015 and 2035, based on the growth rate from the TransCAD Travel Model. (2015 No Build and 2035 No Build scenarios were compared along various links within the model to determine an average growth rate for the area.) The TransCAD Travel Model accounted for future interstate widening. Since Alternatives 4 and 7 are identical at each approach to the interchange (I-75 East of Interchange, I-75 South of Interchange, I-24 West of Interchange), the model growth rate was determined acceptable for both alternatives.

Traffic Analysis

A Level of Service (LOS) analysis was conducted to determine the relative performance of each alternative in 2015 and 2035, during the AM and PM Peak periods. The traffic operation analyses were completed using HCS+ (Highway Capacity Software) on basic freeway segments, weaving segments, ramp merge segments, and ramp diverge segments. Level of Service was used as the measure of effectiveness and the analysis files can be found in Appendix J of this report while approved traffic forecasts can be found in Appendix D.

Level of Service Tables 1-5 display the findings for 2015 and 2035 for all freeway segments, ramp merge segments, ramp diverge segments, and for all weaving segments. The following describes what is denoted in those tables.

- The areas designated as major merges are denoted in blue in the following charts. “A major merge area is one in which two (2) primary roadways, each having multiple lanes, merge to form a single freeway segment.” Additionally, “where a two (2)-lane on-ramp results in a lane addition,” the junction is classified as a major merge segment. According to the Highway Capacity Manual 2000, there are no effective models to predict performance for these major merge areas. Capacities can only be checked on approaching legs and the departing freeway.

- If a single-lane on (or off) ramp results in a lane addition (drop), “the capacity of the ramp is governed by the ramp geometry itself and not by the ramp-freeway junction.” In these situations, the capacity of the ramp roadway is examined. The ramp roadway is not analyzed in terms of LOS but rather if the ramp exceeds capacity (therefore only a LOS F can be received by a ramp roadway when capacity is exceeded). These areas are denoted in yellow in the following charts.
- According to the Highway Capacity Manual 2000, major diverge areas can be analyzed by checking the entering and departing demand on each exit leg against the appropriate entry or departure leg. This “allows the density across all freeway lanes to be estimated for a distance of 1500 ft upstream of the gore area.” The density is then compared with LOS criteria to estimate the LOS in the diverge area. A more accurate representation of traffic conditions present in the I-24/I-75 interchange examines freeway segments both upstream and downstream of the diverge area. These areas are denoted in purple in the following charts.
- Areas denoted in pink in the following charts overlap with weaving segments. The LOS for these areas is determined from the weaving analyses.

Locations of LOS Analysis are coded with a number that is shown on the maps in Appendix E. LOS is also shown on the maps for the 2015 and 2035 No Build scenarios as well as the 2015 and 2035 Alternative 4 and Alternative 7 Build scenarios.

**TABLE 5: WEAIVING LEVEL OF SERVICE
(AM AND PM PEAK HOUR)**

LOS	3 I-75 NB (SOUTH OF INTERCHANGE)							
	NO BUILD		ALT. 4		ALT 7 INITIAL		ALT 7 ULT	
Year	AM	PM	AM	PM	AM	PM	AM	PM
2015	E	D	D	C	F	D	GOVERNED BY FREEWAY SEGMENT ANALYSIS. SEE TABLE 1.	GOVERNED BY FREEWAY SEGMENT ANALYSIS. SEE TABLE 1.
2016	E	D	D	C	F	D		
2017	E	D	D	C	F	D		
2018	F	D	D	C	F	D		
2019	F	D	D	C	F	D		
2020	F	D	D	C	F	D		
2021	F	E	D	C	F	D		
2022	F	E	D	C	F	D		
2023	F	E	D	C	F	D		
2024	F	E	E	C	F	D		
2025	F	E	E	C	F	E		
2026	F	E	E	D	F	E		
2027	F	E	E	D	F	E		
2028	F	E	E	D	F	E		
2029	F	E	E	D	F	E		
2030	F	E	E	D	F	E		
2031	F	E	E	D	F	E		
2032	F	E	E	D	F	E		
2033	F	E	E	D	F	E		
2034	F	E	E	D	F	E		
2035	F	E	E	D	F	E		

TABLE 1: FREEWAY LEVEL OF SERVICE (AM AND PM PEAK HOUR)

LOS	1 I-24 EB (WEST OF INTERCHANGE)								2 I-24 WB (WEST OF INTERCHANGE)								3 I-75 NB (SOUTH OF INTERCHANGE)								4 I-75 SB (SOUTH OF INTERCHANGE)								5 I-75 NB (EAST OF INTERCHANGE)								6 I-75 SB (EAST OF INTERCHANGE)																							
	NO BUILD				ALT. 4				ALT 7 INITIAL				ALT 7 ULT				NO BUILD				ALT. 4				ALT 7 INITIAL				ALT 7 ULT				NO BUILD				ALT. 4				ALT 7 INITIAL				ALT 7 ULT				NO BUILD				ALT. 4				ALT 7 INITIAL				ALT 7 ULT			
	Year	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM													
2015	D	E	B	C	NO MODIFICATIONS FROM EXISTING	NO MODIFICATIONS FROM EXISTING	-	-	F	D	C	B	NO MODIFICATIONS FROM EXISTING	NO MODIFICATIONS FROM EXISTING	-	-	GOVERNED BY WEAVING AREA ANALYSIS. SEE TABLE 5.								B	C	B	C	B	C	-	-	D	D	C	C	NO MODIFICATIONS FROM EXISTING	NO MODIFICATIONS FROM EXISTING	-	-	C	D	C	C	-	-																		
2016	D	F	B	C			-	-	F	D	C	B			-	-	GOVERNED BY WEAVING AREA ANALYSIS. SEE TABLE 5.								B	C	B	C	B	C	-	-	D	D	C	C			-	-	C	D	C	C	-	-																		
2017	D	F	B	C			-	-	F	D	C	B			-	-	GOVERNED BY WEAVING AREA ANALYSIS. SEE TABLE 5.								B	C	B	C	B	C	-	-	D	D	C	C			-	-	C	D	C	C	-	-																		
2018	D	F	B	C			-	-	F	D	C	B			-	-	GOVERNED BY WEAVING AREA ANALYSIS. SEE TABLE 5.								B	C	B	C	B	C	-	-	D	D	C	C			-	-	C	D	C	C	-	-																		
2019	D	F	B	C			-	-	F	D	C	B			-	-	GOVERNED BY WEAVING AREA ANALYSIS. SEE TABLE 5.								B	C	B	C	B	C	-	-	D	D	C	C			-	-	C	D	C	C	-	-																		
2020	D	F	B	C			-	-	F	D	C	B			-	-	GOVERNED BY WEAVING AREA ANALYSIS. SEE TABLE 5.								B	C	B	C	B	C	-	-	D	D	C	C			-	-	C	D	C	C	-	-																		
2021	D	F	B	C			-	-	F	D	C	B			-	-	GOVERNED BY WEAVING AREA ANALYSIS. SEE TABLE 5.								B	C	B	C	B	C	-	-	D	D	C	C			-	-	C	D	C	C	-	-																		
2022	D	F	B	C			-	-	F	D	C	B			-	-	GOVERNED BY WEAVING AREA ANALYSIS. SEE TABLE 5.								B	C	B	C	B	C	-	-	D	D	C	C			-	-	C	D	C	C	-	-																		
2023	D	F	B	C			-	-	F	D	C	B			-	-	GOVERNED BY WEAVING AREA ANALYSIS. SEE TABLE 5.								B	C	B	C	B	C	-	-	D	D	C	C			-	-	C	D	C	C	-	-																		
2024	D	F	B	C			-	-	F	D	C	B			-	-	GOVERNED BY WEAVING AREA ANALYSIS. SEE TABLE 5.								B	C	B	C	B	C	-	-	D	D	C	C			-	-	C	D	C	C	-	-																		
2025	D	F	B	C	NO MODIFICATIONS FROM EXISTING	NO MODIFICATIONS FROM EXISTING	B	C	F	D	C	B	NO MODIFICATIONS FROM EXISTING	NO MODIFICATIONS FROM EXISTING	D	C	GOVERNED BY WEAVING AREA ANALYSIS. SEE TABLE 5.								B	C	B	C	B	C	B	C	D	D	C	C			C	C	D	D	C	C	C	C	C	C																
2026	D	F	B	C			B	C	F	D	C	B			D	C	GOVERNED BY WEAVING AREA ANALYSIS. SEE TABLE 5.								B	C	B	C	B	C	B	C	D	D	C	C			C	C	D	D	C	C	C	C	C	C																
2027	D	F	B	C			B	C	F	D	C	B			D	C	GOVERNED BY WEAVING AREA ANALYSIS. SEE TABLE 5.								B	C	B	C	B	C	B	C	D	D	C	C			C	C	D	D	C	C	C	C	C	C																
2028	D	F	B	C			B	C	F	D	C	B			D	C	GOVERNED BY WEAVING AREA ANALYSIS. SEE TABLE 5.								B	C	B	C	B	C	B	C	D	D	C	C			C	C	D	D	C	C	C	C	C	C																
2029	D	F	C	C			C	C	F	D	C	B			D	C	GOVERNED BY WEAVING AREA ANALYSIS. SEE TABLE 5.								C	B	B	D	B	C	B	C	D	D	C	C			C	C	D	D	C	C	C	C	C	C																
2030	D	F	C	C			C	C	F	D	C	B			D	C	GOVERNED BY WEAVING AREA ANALYSIS. SEE TABLE 5.								C	B	B	D	B	C	B	C	D	D	C	C			C	C	D	D	C	C	C	C	C	C																
2031	D	F	C	C			C	C	F	D	C	B			D	C	GOVERNED BY WEAVING AREA ANALYSIS. SEE TABLE 5.								C	B	B	D	B	C	B	C	D	D	C	C			C	C	D	D	C	C	C	C	C	C																
2032	E	F	C	C			C	C	F	D	C	B			D	C	GOVERNED BY WEAVING AREA ANALYSIS. SEE TABLE 5.								C	B	B	D	B	C	B	C	D	D	C	C			C	C	D	D	C	C	C	C	C	C																
2033	E	F	C	C			C	C	F	D	C	B			D	C	GOVERNED BY WEAVING AREA ANALYSIS. SEE TABLE 5.								C	B	B	D	B	C	B	C	D	D	C	C			C	C	D	D	C	C	C	C	C	C																
2034	E	F	C	C			C	C	F	D	C	B			D	C	GOVERNED BY WEAVING AREA ANALYSIS. SEE TABLE 5.								C	B	B	D	B	C	B	C	D	D	C	C			C	C	D	D	C	C	C	C	C	C																
2035	E	F	C	C			C	C	F	D	C	B			D	C	GOVERNED BY WEAVING AREA ANALYSIS. SEE TABLE 5.								C	B	B	D	B	C	B	C	D	D	C	C			E	F	C	C	D	D	C	C	C	C																

TABLE 2: FREEWAY LEVEL OF SERVICE (AM AND PM PEAK HOUR)

LOS	7 I-24 EB TO I-75 SB RAMP								8 I-24 EB TO I-75 NB RAMP								9 I-75 NB TO I-24 WB RAMP								10 I-75 NB TO I-75 NB RAMP								11 I-75 SB TO I-75 SB RAMP								12 I-75 SB TO I-24 WB RAMP								
	NO BUILD		ALT 4		ALT 7 INITIAL		ALT 7 ULT		NO BUILD		ALT 4		ALT 7 INITIAL		ALT 7 ULT		NO BUILD		ALT 4		ALT 7 INITIAL		ALT 7 ULT		NO BUILD		ALT 4		ALT 7 INITIAL		ALT 7 ULT		NO BUILD		ALT 4		ALT 7 INITIAL		ALT 7 ULT										
Year	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM					
2015	B	C	A	B	B	C	-	-	D	E	C	C	NO MODIFICATIONS FROM EXISTING	NO MODIFICATIONS FROM EXISTING	-	-	D	B	C	B	D	B	-	-	D	C	B	B	B	B	-	-	B	D	A	C	A	C	-	-	E	D	C	C	NO MODIFICATIONS FROM EXISTING	NO MODIFICATIONS FROM EXISTING	-	-	
2016	B	C	A	B	B	C	-	-	D	E	C	C			-	-	D	C	C	B	D	C	-	-	D	D	B	B	B	B	B	-	-	B	D	A	C	A	C	-	-	E	D	C			C	-	-
2017	B	C	A	B	B	C	-	-	D	E	C	C			-	-	D	C	C	B	D	C	-	-	D	D	B	B	B	B	B	-	-	B	D	A	C	A	C	-	-	E	D	C			C	-	-
2018	B	C	A	B	B	C	-	-	D	E	C	C			-	-	D	C	C	B	D	C	-	-	D	D	B	B	B	B	B	-	-	B	D	B	C	B	C	-	-	E	D	C			C	-	-
2019	B	C	A	B	B	C	-	-	D	E	C	C			-	-	D	C	C	B	D	C	-	-	D	D	C	B	C	B	-	-	B	D	B	C	B	C	-	-	E	D	C	C			-	-	
2020	B	C	A	B	B	C	-	-	D	E	C	C			-	-	D	C	C	B	D	C	-	-	D	D	C	B	C	B	-	-	B	D	B	C	B	C	-	-	E	D	C	C			-	-	
2021	B	C	A	B	B	C	-	-	D	E	C	C			-	-	D	C	C	B	D	C	-	-	D	D	C	B	C	B	-	-	B	D	B	C	B	C	-	-	E	D	C	C			-	-	
2022	B	C	A	B	B	C	-	-	D	E	C	C			-	-	D	C	C	B	D	C	-	-	D	D	C	C	C	C	-	-	B	D	B	C	B	C	-	-	E	D	C	C			-	-	
2023	B	C	A	B	B	C	-	-	D	E	C	C			-	-	D	C	C	B	D	C	-	-	D	D	C	C	C	C	-	-	B	D	B	C	B	C	-	-	F	D	C	C			-	-	
2024	B	C	A	B	B	C	-	-	D	E	C	C			-	-	D	C	C	B	D	C	-	-	D	D	C	C	C	C	-	-	C	E	B	C	B	C	-	-	F	D	C	C			-	-	
2025	B	C	A	B	B	C	A	B	D	E	C	C	-	-	C	C	E	C	C	B	E	C	C	B	D	D	C	C	C	C	B	B	C	E	B	C	-	-	B	C	F	D	C	C	-	-			
2026	B	C	A	B	B	C	A	B	D	E	C	C	-	-	C	C	E	C	C	B	E	C	C	B	D	D	C	C	C	C	B	B	C	E	B	C	-	-	B	C	F	D	C	C	-	-			
2027	B	C	A	B	B	C	A	B	D	F	C	C	-	-	C	C	E	C	C	B	E	C	C	B	D	D	C	C	C	C	B	B	C	E	B	C	-	-	B	C	F	D	C	C	-	-			
2028	B	C	A	B	B	C	A	B	D	F	C	C	-	-	C	C	E	C	C	B	E	C	C	B	D	D	C	C	C	C	B	B	C	E	B	C	-	-	B	C	F	D	C	C	-	-			
2029	B	C	A	B	B	C	A	B	D	F	C	C	-	-	C	C	E	C	C	B	E	C	C	B	D	D	C	C	C	C	B	C	C	E	B	C	-	-	B	C	F	F	C	C	-	-			
2030	B	D	A	B	B	D	A	B	D	F	C	C	-	-	C	C	E	C	C	B	E	C	C	B	D	D	C	C	C	C	B	C	C	E	B	C	-	-	B	C	F	F	C	C	-	-			
2031	B	D	A	B	B	D	A	B	E	F	C	C	-	-	C	C	E	C	C	B	E	C	C	B	D	D	C	C	C	C	B	C	C	E	B	C	-	-	B	C	F	F	D	C	-	-			
2032	B	D	A	B	B	D	A	B	E	F	C	C	-	-	C	C	E	C	C	B	E	C	C	B	D	D	C	C	C	C	B	C	C	E	B	C	-	-	B	C	F	F	D	C	-	-			
2033	B	D	A	B	B	D	A	B	E	F	C	C	-	-	C	C	E	C	C	B	E	C	C	B	D	D	C	C	C	C	C	C	E	B	C	-	-	B	C	F	F	D	C	-	-				
2034	B	D	A	B	B	D	A	B	E	F	C	C	-	-	C	C	E	C	C	B	E	C	C	B	D	D	C	C	C	C	C	E	B	C	-	-	B	C	F	F	D	C	-	-					
2035	B	D	B	B	B	D	B	B	E	F	C	D	-	-	C	D	E	C	C	B	E	C	C	B	E	D	C	C	C	C	C	E	B	C	-	-	B	C	F	F	D	C	-	-					

TABLE 3: RAMP DIVERGE LEVEL OF SERVICE (AM AND PM PEAK HOUR)

[illegible]

TABLE 4: RAMP MERGE LEVEL OF SERVICE (AM AND PM PEAK HOUR)

[illegible]

In addition to the HCS analyses, the transportation system along I-75 at I-24 was modeled using VISSIM Traffic Simulations. VISSIM is a behavior-based, microscopic simulation model software package that provides a graphic and numeric representation of lane geometry, driver behavior, signal timing, and traffic volumes. The model evaluates the performance of a network or intersection using measures of effectiveness such as travel time or queue length. A traffic simulation model was developed along the project corridor to evaluate the interaction of closely spaced freeway and ramp segments along I-24 and I-75. The VISSIM simulations were used to analyze the existing weaving conditions within the rest area segment and check merge and diverge locations within the study area.

The existing VISSIM simulations identified two major areas of concern. The weaving segment along I-75 NB between Ringgold Road and the Welcome Center and the I-24 EB to I-75 SB major diverge both resulted in high levels of congestion. Simulations of both Alternatives 4 and 7 relieved the congestion at the I-24 EB to I-75 SB major diverge. Congestion at the weaving segment was reduced in Alternative 4 and completely removed with Alternative 7.

B. Safety Analysis

The Tennessee Department of Transportation completed a Road Safety Audit Review (RSAR) throughout the project corridor in March 2006. A copy of the RSAR can be found in Appendix K. A crash ratio (actual crash rate divided by critical crash rate) of 5.75 was calculated along I-75 between log mile 1.11 and 1.20, which exceeds the minimum threshold of 3.5 for Hazard Elimination Safety Program funds.

The RSAR documented rear-end and sideswipe crashes along Northbound I-75 to the weaving segment between the Ringgold Road merge and the I-24 diverge. The cause was attributed to the short weaving segment, in addition to the on and off ramps to the Welcome Center. The RSAR also found that truck rollovers are common along Northbound and Southbound I-75. Contributing factors to these truck rollovers includes truck speed, weather conditions, and load shifts. Additionally, there was a dip in the Southbound I-75 pavement caused by a drop off in superelevation when the curve meets the bridge deck. Truckers often overcorrected at this location, resulting in load shifts.

The RSAR recommended installing rollover warning and speed advisory signs along Northbound and Southbound I-75. Additional overhead diagrammatic signs were recommended along Northbound I-75 and Eastbound I-24 to provide motorists additional time to get into their lane. Repaving the Southbound I-75 segment to correct the superelevation change near the bridge deck was also recommended. The mitigation strategies recommended by the RSAR team were implemented.

Additionally, the proposed Alternatives 4 and 7 will further improve safety within the interchange by providing the following:

- Adequate acceleration and deceleration lanes and taper lengths,
- Improving ramp radii and speeds thus further reducing the potential for truck rollovers,
- Decreasing congestion, improving or eliminating the weaving segment along I-75 between Ringgold Road and I-24, and
- Maintaining advance warning guide signs to allow motorists time to reach their destination lane.

C. Access Analysis

This study has been undertaken in accordance with the Federal Highway Administration's (FHWA) policy for granting new or modified interstate access. The FHWA policy, as described in Federal Register 74, No. 165, August 27, 2009), is provided in the following paragraphs along with comments for consideration.

It is in the national interest to preserve and enhance the Interstate System to meet the needs of the 21st Century by assuring that it provides the highest level of service in terms of safety and mobility. Full control of access along the Interstate mainline and ramps, along with control of access on the crossroad at interchanges, is critical to providing such service. Therefore, FHWA's decision to approve new or revised access points to the Interstate System must be supported by substantiated information justifying and documenting that decision. The FHWA's decision to approve a request is dependent on the proposal satisfying and documenting the following requirements:

1. ***The need being addressed by the request cannot be adequately satisfied by existing interchanges to the Interstate, and/or local roads and streets in the corridor can neither provide the desired access, nor can they be reasonably improved (such as access control along surface streets, improving traffic control, modifying ramp terminals and intersections, adding turn bays or lengthening storage) to satisfactorily accommodate the design-year traffic demands (23 CFR 652.2(a)).***

I-75 is a regional facility that serves both Tennessee and Georgia and I-24 serves as a direct link between I-75 and I-59. Each of these facilities provide a direct connection to downtown Chattanooga, Lookout Mountain, and other area attractions. This Interstate Access Request proposes maintaining the existing regional access by modifying the existing I-75/I-24 interchange as opposed to adding an additional interchange to the system.

Analyses of the existing interchange revealed several movements that are at or beyond capacity in 2015 with most of the area expected to perform at or beyond capacity by the design year 2035. In the initial design stages of modifications for the I-75/I-24 interchange, an alternative (Alternative 1) was developed that would maintain the existing interchange geometry with simply widening the existing

facilities. It was determined during the selection process that this alternative would not meet the project goals. Although capacity would be increased, additional laneage would not improve the Ringgold Road and Welcome Center merging points or correct substandard ramp geometry. Four (4) other alternatives were studied but were eliminated due to not meeting the purpose and need.

Revised access is necessary to increase capacity, correct merge points, and improve ramp geometry. Alternatives 4 and 7 both address these issues. Proposed modifications result in improved safety of the interstate while providing a facility that meets design year traffic demands. There will not be a need to improve cross roads at adjacent interchanges.

2. *The need being addressed by the request cannot be adequately satisfied by reasonable transportation system management (such as ramp metering, mass transit, and HOV facilities), geometric design, and alternative improvements to the Interstate without the proposed change(s) in access (23 CFR 625.2(a)).*

Seven (7) alternatives were initially developed for the I-75/I-24 interchange (a discussion of these can be found in Chapter 1 and Appendix A). Alternatives addressed widening the existing facilities, increasing ramp radii to improve geometry and provide higher design speeds, modifying the alignment so that I-75 is the thru route, and modifications to the rest area ramps. The alternatives ranged from staying within the existing corridor to shifting east and west of the existing interchange. An adequate number of alternatives were considered to ensure that the most cost-effective solution was developed that increases safety, meets the transportation needs, and enhances traffic flow. Alternatives were evaluated based on their design speed, right-of-way impacts, and environmental impacts. After a preliminary review meeting with TDOT and FHWA officials, Alternative 1 was eliminated due to ramp design speeds less than 55 mph, Alternatives 2 and 5 were eliminated due to impacts to the conservation area east of I-75, and Alternatives 3 and 6 were eliminated due to property impacts and geometric design concerns. Ultimately, Alternatives 4 and 7 were selected to be further developed in the Interstate Access Request document and to gain operational approval. Alternative 7 is the preferred alternative based on the ability to eliminate the weave conditions along I-75.

Providing park and ride lots within the interchange is not desirable and would create ingress/egress problems due to ramps and grade-separations. Park and Ride lots would be possible at the adjacent interchanges and could be studied for implementation.

High-occupancy vehicle (HOV) lanes are not currently present within Chattanooga and there are currently no plans for HOV lanes to be constructed

along I-24 and I-75 in the project vicinity. HOV lanes have not been included in the proposed modifications nor are they considered desirable in this isolated area. Rather, the use of HOV facilities in this area could be part of a larger study that analyzes if HOV lanes are needed and if they provide a benefit along the entire I-24 and I-75 corridors.

Ramp metering is commonly used to regulate traffic that is entering the interstate facility at an on-ramp. The modifications included in this Interstate Access Request include the three (3) on-ramps at the adjacent interchanges. These include the Ringgold Road to I-75 NB on-ramp (ID Point 23), the East Brainerd Road to I-75 SB on-ramp (ID Point 24), and the South Moore Road to EB I-24 on-ramp (ID Point 22). There are several strategies included in the FHWA's "Ramp Management and Control Handbook" (January 2006) that identify when to use ramp metering. Based on the strategies outlined in this handbook, ramp metering is not warranted in this area. This analysis is based on the following:

- The on-ramps result in lane additions which may eliminate the immediate need for merging with the interstate traffic
- There are concerns with having adequate storage lengths available on some of the ramps to maintain ramp metered queues during peak hours and to allow vehicles to accelerate to freeway speeds
- The freeway segments near the on-ramps perform at a LOS D or better in the 2035 design year which indicates that ramp metering is not necessary

Additionally, the I-24 and I-75 corridor throughout the project area is currently equipped with Intelligent Transportation Systems.

3. ***An operational and safety analysis has concluded that the proposed change in access does not have a significant adverse impact on the safety and operation of the Interstate facility (which includes mainline lanes, existing, new, or modified ramps, ramp intersections with crossroad) or on the local street network based on both the current and the planned future traffic projections. The analysis shall, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (23 CFR 625.2(a), 655.603(d) and 771.111(f)). The crossroads and the local street network, to at least the first major intersection on either side of the proposed change in access, shall be included in this analysis to the extent necessary to fully evaluate the safety and operational impacts that the proposed change in access and other transportation improvements may have on the local street network (23 CFR 625.2(a) and 655.603(d)). Requests for a proposed change in access must include a description and assessment of the impacts and ability of the proposed changes to safely and efficiently collect, distribute and accommodate traffic on the Interstate facility, ramps, intersection of ramps with crossroad, and local street network (23 CFR 625.2(a) and 655.603(d)). Each request must also include a conceptual plan of the type***

and location of the signs proposed to support each design alternative (23 U.S.C. 109(d) and 23 CFR 655.603(d)).

Analyses of current and future traffic were completed for freeway segments, merge and diverge movements, and weaving segments within the limits of the I-75/I-24 interchange area. No build analyses for the design year 2035 reveals that much of the area surrounding the interchange will be performing at or beyond functional capacities. Modifications implemented from both Alternatives 4 and 7 will significantly improve the I-75/I-24 interchange and analysis indicates that all segments of the freeway will operate at an acceptable level of service with either alternative. Improving substandard ramp geometry, providing additional laneage, improving design speeds, and enhancing merge/diverge points should reduce the crash potential and improve the overall safety of the interchange.

I-75 (South of I-75/I-24 Interchange)

The existing weaving segment along I-75 NB between the welcome center on-ramp and the I-24 diverge results in a LOS E/D (AM/PM) for the no build scenario in 2015 and the no build 2035 yields a LOS F/E. For Alternative 4, an additional lane is added throughout the area resulting in a LOS increase to D/C in 2015 and E/D in 2035. In the Initial Phase of Alternative 7, the existing laneage stays the same, but the I-24 off-ramp is switched from a left-hand exit to a right-hand exit and the weave distance is reduced by approximately 1000 ft. These modifications result in a LOS F/D in 2015 and following the construction of the Ultimate Phase the existing weaving segment is eliminated. One (1) lane is added throughout the area as with Alternative 4. With the Ultimate Phase of Alternative 7, however, the on ramp for the rest area is reconfigured, eliminating the existing weave. The freeway segment for Alternative 7 results in a 2035 LOS C/C. With the Ultimate Phase of Alternative 7 completed, the I-75 NB freeway segment operates at a LOS C. With Alternative 4, the weaving segment operates at a LOS D or better with the exception of the AM movement beginning in Year 2024.

The existing freeway segment along I-75 SB extending from the I-24 ramp merge to the Ringgold Road off-ramp results in a no build LOS B/C for 2015 and B/D for 2035. An additional lane is added throughout the area in Alternatives 4 and in the Initial Phase of Alternative 7 and resulting in a LOS B/C in 2015 and 2035. LOS C or better are maintained throughout this area with both Alternatives 4 and 7.

The Ringgold Road Merge to I-75 NB results in a LOS F/D for both 2015 and 2035 no build scenarios. In Alternative 4, the Ringgold Road Northbound Merge to I-75 results in a one (1) lane addition from the ramp which cannot be analyzed for LOS and the ramp capacity check is not exceeded in the AM or PM peak

hours for 2035. In the Initial Phase of Alternative 7, no modifications are made to the merge point (maintaining the LOS F/D for both 2015 and 2035) and in the Ultimate Phase, the Ringgold Road Northbound Merge is reconfigured, which eliminates this merge point.

The Ringgold Road Diverge from I-75 SB results in a two (2) lane off-ramp with a lane drop under the existing conditions, as well as under Alternatives 4 and 7. This scenario is analyzed as a major diverge segment.

I-75 (East of I-75/I-24 Interchange)

The existing freeway segment along I-75 NB between the I-24 merge and East Brainerd Road diverge results in a 2015 no build scenario LOS D/D (AM/PM) and a 2035 LOS of E/E. For Alternative 4 and the Ultimate Phase of Alternative 7, an additional lane is added throughout the area. Alternative 4 results in a 2015 LOS C/C. Alternative 4 and the Ultimate Phase of Alternative 7 results in a 2035 LOS C/D. There are no changes from the existing configuration for the Initial Phase of Alternative 7, which would maintain the 2015 LOS D/D. With the proposed modifications of Alternatives 4 and 7, the freeway segment will perform at a LOS D or better for 2015 and 2035.

I-75 SB between East Brainerd Road merge and I-24 diverge results in a no build LOS C/D in 2015 and LOS D/E in 2035. There are no modifications to this segment in the Initial Phase of Alternative 7, which would maintain the 2015 LOS C/D. An additional lane is provided for Alternatives 4 and the Ultimate Phase of Alternative 7. 2015 Alternative 4 LOS is C/C. Alternative 4 and 7 result in a 2035 LOS C/D. The proposed modifications will increase the LOS to D or better.

The East Brainerd Road Merge to I-75 SB results in a one (1) lane addition from the ramp which cannot be analyzed for LOS. The ramp capacity is not exceeded in the AM or PM peak hours for 2035.

The East Brainerd Road Diverge from I-75 NB results in a 2015 no build LOS C/D and 2035 LOS D/E. The Initial Phase of Alternative 7 does not modify the ramp area so the LOS remains C/D in 2015. In Alternatives 4 and the Ultimate Phase of Alternative 7, an additional lane is provided that creates a one (1) lane drop to the ramp which cannot be analyzed for LOS but the ramp capacity is not exceeded in the AM or PM peak hours for the design period.

I-24 (West of I-75/I-24 Interchange)

The existing freeway segment along I-24 EB between the South Moore Road on-ramp and the I-75 Diverge results in a 2015 no build LOS D/E (AM/PM) and the 2035 no build LOS is E/F. The Initial Phase of Alternative 7 does not result in any modifications to the area, thus maintaining the 2015 LOS D/E. Alternatives 4

and the Ultimate Phase of Alternative 7 add two (2) lanes to the segment and improve the 2015 LOS to B/C for Alternative 4. Alternatives 4 and the Ultimate Phase of Alternative 7 improve to a 2035 LOS C/C. With the addition of the proposed modifications in Alternative 4 and the Ultimate Phase of Alternative 7, the freeway segment will improve to a LOS C or better.

The existing freeway segment along I-24 WB between the I-75 Merge and the South Moore Road off-ramp is a 2015 no build LOS F/D and a 2035 LOS F/F. No modifications are made to the existing configuration in the Initial Phase of Alternative 7. Alternative 4 and the Ultimate Phase of Alternative 7 add two (2) lanes throughout the area resulting in a 2015 LOS C/B for Alternative 4. Alternatives 4 and the Ultimate Phase of Alternative 7 result in a 2035 LOS D/C and improve the freeway segment to a LOS D or better with the modifications proposed in Alternative 4 and the Ultimate Phase of Alternative 7.

The South Moore Road Merge with I-24 EB results in a 2015 no build LOS D/E and a 2035 LOS E/F. The Initial Phase of Alternative 7 does not result in any modifications to the area and maintains the existing 2015 LOS. Alternatives 4 and 7 adds a one (1) lane addition from the ramp and cannot be analyzed for LOS but the ramp capacity is not exceeded in the AM or PM peak hours for the design period.

The South Moore Road Diverge from I-24 WB results in a LOS F/D for 2015 no build and a LOS F/F for 2035 no build. Alternative 4 and the Ultimate Phase of Alternative 7 result in a one (1) lane drop to the ramp which cannot be analyzed for LOS but the ramp capacity is not exceeded for 2035.

Preliminary signing plans have been developed for Alternatives 4 and 7. A conceptual signing plan for both alternatives can be found in Appendix F.

- 4. *The proposed access connects to a public road only and will provide for all traffic movements. Less than “full interchanges” may be considered on a case-by-case basis for applications requiring special access for managed lanes (e.g., transit, HOVs, HOT lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a)(2), and 655.603(d)).***

I-24 and I-75 are currently on the National Interstate System and the modifications proposed in Alternatives 4 and 7 maintain all traffic movements and allow for continued service to the region. Preliminary design has shown that the proposed modifications for both alternatives are geometrically sufficient and constructible. As preliminary design proceeds, all modifications will be designed to current federal standards for interstate highways and will meet or exceed all American Association of State Highway and Transportation Officials (AASHTO)

criteria. The following design criteria have been addressed with the preliminary design phase:

- Sight distance at adjacent interchange ramp terminals is adequate.
- The first ramp at each adjacent interchange was analyzed based on current and projected demand for storage length. Each ramp will not exceed capacity.
- All structures will meet the minimum vertical clearance as described in AASHTO's "A Policy on Design Standards Interstate System."
- Pedestrians will not be given access throughout the major directional interchange. However, access is currently given at adjacent interchanges.
- The length of all acceleration and deceleration lanes as well as the length of tapers will meet or exceed AASHTO guidelines based on ramp entrance and exit speeds.
- All ramp spacing distances between on and off ramps as described for system interchanges in AASHTO have been met.
- The interchange will maintain lane continuity and lane balance principles as described by AASHTO.
- The interchange design and operational patterns are consistent with driver expectancy and with adjacent interchanges. The I-75/I-24 interchange is a major directional interchange and is the end of I-24.

The modifications to the proposed interchange have been evaluated for operation as outlined in AASHTO's "A Policy on Geometric Design of Highways and Streets." Each pathway has been evaluated for operation from the driver's point of view, which includes merging and diverging lanes and signing along the pathway. The interchange layout meets driver expectancy and improves traffic flow.

Appendix B shows detailed plan sheets for Alternative 4, while Alternative 7 Initial and Ultimate plan sheets can be found in Appendix C.

- 5. *The proposal considers and is consistent with local and regional land use and transportation plans. Prior to receiving final approval, all requests for new or revised access must be included in an adopted Metropolitan Transportation Plan, in the adopted Statewide or Metropolitan Transportation Improvement Program (STIP or TIP), and the Congestion Management Process within transportation management areas, as appropriate, and as specified in 23 CFR part 450, and the transportation conformity requirements of 40 CFR parts 51 and 93.***

The I-75/I-24 interchange is located within the Chattanooga-Hamilton County/ North Georgia (CHCNGA) Transportation Planning Organization's (TPO) boundary. The CHCNGA TPO Long Range Transportation Plan's All Needs Plan details interchange reconstruction at I-24 between Belvoir Avenue and I-75

as well as interchange widening along I-75 south and east of the interchange. Additionally, the CHCNGA's Transportation Improvement Program (TIP) for Fiscal Years 2011-2014 provides for a feasibility/environmental study and the State Transportation Improvement Program (STIP) will be amended to include the I-75/I-24 modifications. If the project is to be constructed in phases, amendments to include both initial and ultimate construction will be included in the STIP.

6. ***In corridors where the potential exists for future multiple interchange additions, a comprehensive corridor or network study must accompany all requests for new or revised access with recommendations that address all of the proposed and desired access changes within the context of a longer-range system or network plan (23 U.S.C. 109(d), 23 CFR 625.2(a), 655.603(d), and 771.111).***

According to the CHCNGA 2035 LRTP there are no expectations for future interchanges in this vicinity. The CHCNGA 2035 LRTP only identifies one (1) new interchange in the Chattanooga city limits. The proposed interchange, at Ooltewah Georgetown Road, is approximately thirteen (13) miles to the northeast of the proposed project location. Additionally, the I-75 at I-24 interchange modifications are consistent with the previously completed I-75 Corridor Feasibility Study. The interstate corridor study does not provide for any additional interchanges in the study area.

7. ***When a new or revised access point is due to a new, expanded, or substantial change in current or planned future development or land use, requests must demonstrate appropriate coordination has occurred between the development and any proposed transportation system improvements (23 CFR 625.2(a) and 655.603(d)). The request must describe the commitments agreed upon to assure adequate collection and dispersion of the traffic resulting from the development with the adjoining local street network and Interstate access point (23 CFR 625.2(a) and 655.603(d)).***

The primary objective of the proposed modifications is to improve safety issues within the interchange area due to substandard ramp geometry and improve operational deficiencies that have resulted from growth in the Chattanooga area. The modifications do not relate to any existing or proposed commercial or residential development within the vicinity of the interchange. However, during the process of developing this Interstate Access Request, a development along the east side of I-75 at Ringgold Road has been proposed. This development is in preliminary stages and has yet to be approved. This development will be accessed via Ringgold Road only. Future year traffic volumes accounted for the proposed development. If the proposed development is approved, it is anticipated the existing weaving problem will continue to deteriorate along I-75

with the no build and Alternative 4 alignments. The weaving condition would be eliminated with the Alternative 7 alignment.

The modifications along I-75 and I-24 will be completed by TDOT and does not require financial commitments from other entities. Additionally, the proposed modifications to the interchange are not contingent on the timing of other improvements.

8. *The proposal can be expected to be included as an alternative in the required environmental evaluation, review and processing. The proposal should include supporting information and current status of the environmental processing (23 CFR 771.111).*

Environmental studies were not conducted during this phase but will begin once operational approval has been granted by the FHWA. It will be emphasized to project stakeholders that the Interstate Access Request submitted will be a two-step process. The first step entails the engineering and operational acceptability as requested in this document. The second step of the process will be the environmental approvals.

A National Environmental Policy Act (NEPA) study for the project will be conducted. Project design and construction will comply with regulations set forth by Section 106 of the National Historic Preservation Act, Section 4(f), and the Americans with Disabilities Act. It is anticipated that there are not any threatened or endangered species in the area nor will there be any historical sites that will be impacted by the proposed interchange modifications. Further studies will be necessary to determine any historic, archaeological, noise, or ecological impacts of constructing an interchange.

There are wetlands located to the west of the existing I-75/I-24 interchange although the preferred Alternatives 4 and 7 are not anticipated to encroach on this area. Additionally, there is a flood way in the area and any modifications to the interchange are not expected to require the acquisition of any residences.

Camp Jordan is located to the east of the existing I-75/I-24 interchange. Camp Jordan is a 257 acre recreation facility with biking and walking trails. Associated with Camp Jordan is a Conservation Easement. The preferred Alternatives 4 and 7 are not anticipated to impact the area. If by some unknown circumstance, Camp Jordan is affected, mitigation will be required. Regulations set forth by Section 4(f) will be followed.

Additionally, the Brainerd Road Master Plan identifies the long range goals of the area along with outlining stormwater/green infrastructure improvements. As part of the environmental process and future design, the project team will explore opportunities to reduce water runoff and improve the areas water quality that is currently being incorporated with the current project from East Brainerd Road to Spring Creek Road.

Furthermore, transportation conformity is a process required of Metropolitan Planning Organizations (MPOs) pursuant to the Clean Air Act Amendments (CAAA) of 1990. CAAA require that transportation plans, programs, and projects in nonattainment or maintenance areas that are funded or approved by the Federal Highway Administration (FHWA) be in conformity with the State Implementation Plan (SIP), which represents the State's plan to either achieve or maintain the National Ambient Air Quality Standard (NAAQS) for a particular pollutant. Projects conform to the SIP if they are included in a fiscally constrained and conforming Long Range Transportation Plan (LRTP) and Tennessee's State Transportation Improvement Program (STIP). The Chattanooga-Hamilton County/North Georgia (CHCNGA) Transportation Planning Organization (TPO) has been designated a non-attainment area for particulate matter of 2.5 microns or less in size (Chattanooga-Hamilton County/North Georgia LRTP 2035, Volume 2, Conformity Determination Report). For all other criteria pollutants, CHCNGA is designated as in attainment. Modifications to the interstate must conform to standards and not produce new air quality violations, worsen existing violations, or delay timely attainment of the NAAQS.

D. Cost

The total estimated construction costs for Alternatives 4 and 7 are detailed in Appendix G. The estimated cost associated with Alternative 4 is \$50,200,000. Alternative 7 is expected to cost \$34,100,000 in the Initial Phase and an additional \$54,900,000 (2025 dollars) in the Ultimate Phase.

E. Bicycle and Pedestrian Considerations

Bicycle and pedestrian routes will not be provided along the interstate or ramps due to the complexities involved with negotiating the interchange. However, bicyclists and pedestrians currently have access across the interstate at adjacent interchanges.

CHAPTER 4

SUMMARY AND CONCLUSIONS

The I-75 and I-24 corridor is a heavily traveled corridor that serves both Tennessee and Georgia. Much of the I-75/I-24 interchange will operate at or exceed capacity in the design year, resulting in long delays and congestion if the proposed modifications are not completed. The LOS analyses in Tables 1 thru 5 demonstrate the existing capacity of the freeway and ramps performance through the design year. These tables also demonstrate how the performance of these segments can be increased if the improvements outlined in either Alternative 4 or 7 of this Interstate Access Request are completed. The improvements enhance merge and diverge points, increase laneage, and correct substandard ramp geometry. With the proposed modifications, the area around the I-75/I-24 interchange can perform at acceptable levels of service through the design year and should improve the overall safety of the area.